10-12

Vietnam's Aquaculture Trade: Food Safety and Sanitation Issues

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Executive Summary

Vietnam's rapidly increasing seafood exports have made a significant contribution to the country's economic development over the past few years, largely as a result of vastly increased production from aquaculture. Currently, processed aquatic products are one of Vietnam's four major export items in value terms. Success, however, breeds new challenges. Experts note that in recent years food safety standards have become a more prominent issue for global trade in agricultural, aquatic, and food products. Like other livestock production, aquaculture uses antibiotics, vaccines, and other production practices that may have food safety implications that can trigger trade restrictions. Most Vietnamese seafood export enterprises are having difficulties understanding the food hygiene and environmental requirements in the individual importing markets as well as in consumer chains. Given the lack of a comprehensive model for managing antibiotics and other chemicals, trade actions against the Vietnamese seafood export sector have been relatively frequent. The sector now faces strict food safety, sanitary, and environmental standards required by developed countries, especially the European Union, Japan, and the United States. Market access for Vietnamese seafood exports has been affected by the rigorous and ever-changing standards. Compliance with these standards has placed a heavy burden on Vietnamese exporters, which are mainly small and medium-sized enterprises. The cost of compliance has also reduced the competitiveness of Vietnam's seafood industry.

To overcome this challenge and in response to stricter market access requirements, the government and private sector in Vietnam have undertaken a number of actions to secure the entry of its exports in overseas markets. Nonetheless, many problems remain in Vietnam's food safety regulatory system. They include the lack of a comprehensive model for managing antibiotics and chemical and biological products; low awareness of the food sanitation issues of different stakeholders; and lack of institutional, technical, and financial resources to ensure the sanitation standards.

Both the government and the private sector in Vietnam must act faster and more skillfully to strengthen their capacity. Vietnam will also benefit from meeting these requirements because they will help strengthen state management capacity and competitiveness, improve health, and promote more sustainable use of natural resources.

Your assignment is to recommend to the Vietnamese government policies how to deal with the combined food safety and trade issues related to the expansion of aquaculture production for export and domestic consumption.

Background

Food safety covers all aspects of the food chain from production to consumption. From consumers' perspective, food safety implies food products that are clean with no contaminants, bacteria, or harmful additives. To be safe, food must be produced, processed, and stored properly. The food must be free of pesticide residues, growth hormones, antibiotics, and artificial ingredients (Hartman 2005). From a legislative and food management perspective, food safety covers all the measures taken to protect human health from harm arising from the consumption of food (Stranks 2007). Food safety risks to human health include

- microbial pathogens such as illness-causing bacteria, viruses, parasites, fungi, and their toxins;
- residues from pesticides, food additives, livestock drugs, and growth hormones;
- environmental toxins such as heavy metals (for example, lead and mercury);
- persistent organic pollutants such as dioxin;
- unconventional agents such as prions associated with bovine spongiform encephalopathy (BSE) or "mad cow disease" in cattle;
- zoonotic diseases that can be transmitted through food from animals to humans such as tuberculosis; and
- foods produced or processed with practices perceived to involve risks, such as irradiation.

Scientists generally agree that food safety risks are low relative to many human health risks such as

cancer and heart disease. Among food safety hazards, human health risks are highest from food-borne pathogens such as *Campylobacter* and *Salmonella,* each of which causes well over a million episodes of illness annually in the United States (Mead et al. 1999). These pathogens are also common worldwide.

On a global scale, the extent of illness from contaminated aquatic products is high. The World Health Organization (WHO) estimates that 40 million people become infected each year from trematode parasites by consuming raw or inadequately processed shellfish, freshwater fish, and aquatic plants (WHO 1995). Data are not available on the extent of food-borne illnesses worldwide from all types of seafood hazards. These hazards include the following:

- ***Bacteria:*** Seafood potentially contains a number of different bacteria; some examples are *Vibrio parahaemolyticus, Listeria, Salmonella,* and *Staphylococcus.*
- ***Viruses:*** Illnesses from viruses, such as the Norwalk virus, can be associated with the consumption of shellfish, particularly raw shellfish.
- ***Toxins:*** Some naturally occurring toxins can accumulate in fish and mollusks. Examples include ciguatera found in some large tropical reef fish; domoic acid found in shellfish and mollusks; saxitoxin, also found in shellfish; and histamine found in mahi and tuna.
- ***Parasites:*** A number of fish species are at risk of having parasites such as roundworms. These parasites normally affect human health only when fish are eaten raw or not fully cooked. The U.S. Food and Drug Administration (FDA) Model Food Code requires freezing to destroy these organisms in fish for raw consumption.
- ***Chemicals:*** Chemicals can be a localized problem in freshwater species but can also affect ocean fish. Chemical contamination can result from local spills or dumping of pesticides, industrial chemicals, heavy metals, and petroleum products. In some cases heavy metals such as mercury can be naturally occurring.

For food to be safe for human consumption, the food supply must be protected from microbial hazards, chemical hazards (that is, rancidity or browning), and physical hazards (that is, drying out or infestation) or contamination that may occur during all stages of food production and handling—growing, harvesting, processing, transporting, preparing, distributing, and storing.

Increasing incidence and publicity of food-borne illnesses due to bacterial contamination has led to widespread concern about food safety issues and led to the development of food hygiene standards and mandatory regulations in many countries. To close the gap between the regulatory standards and programs of different countries, the World Trade Organization (WTO) established the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) to encourage its members to harmonize national standards with the standards of the Codex Alimentarius Commission created by the Food and Agriculture Organization of the United Nations (FAO) and the WHO (Anders and Caswell 2006).

At present, the biggest challenge for Vietnam's exporters of aquatic products is to meet the requirements on the content of antibiotic and chemical residues set by the European Union (EU), Japan, and the United States. Currently, producers use many medicines, chemicals, and biological products as they culture, process, and preserve seafood in Vietnam and elsewhere. These products help increase productivity, production, and food efficiency and reduce the death rate and susceptibility to disease in fish. At the same time, however, they have negative effects on human health, product quality, and the environment. For these reasons, importers have normally imposed strict regulations and standards related to antibiotic and chemical residues in seafood products and strict measures to examine and punish any violations of these rules. Despite the SPS Agreement, Vietnam's major export markets each apply different SPS measures to food safety from fishery products, and they require the exporting countries to apply the same or equivalent measures.

With its strict requirements, the EU has been a tough market for Vietnam's exported seafood. The EU has a comprehensive food safety strategy with standards and regulations to ensure that food is treated properly from farm to table. The high

standards apply both to food produced inside the EU and to imported food. Vietnam's seafood exports are subject to EU Regulation 178/2008 ("General principles to guarantee food safety for consumers") and Regulation 8522004 ("Special principles for products originated from animals"). Food imported into the EU must be tested thoroughly for any antibiotic or chemical residues (under instruction No. 96/23 EC). Food supplements, colorings, and hormones are subject to specific standards as well. The EU's Food Law completely bans the use of 10 antibiotics (zero residues) and regulates the maximum residue limit for use of another 10 antibiotics. The use of some of these drugs not only harms human heath, but also causes pollution.

In Japan, to protect domestic consumers, the Law on Food Sanitation and Safety, Law on Disease Control, and Trade Law govern the importation of food. Strict regulations ensure that only food deemed extremely safe for human consumption is imported. Banned imports include food that contains diseases and harmful substances, is out of date or spoiled, or fails to satisfy technical standards regarding processing materials, formulas, and transportation. In 2006 Japan also introduced new regulations on the use of antibiotics in aquaculture and processing. Fifteen substances are banned, eight of which are also banned in Vietnam, and a further 61 substances are regulated with a maximum residue level. Japan also issued a list of 38 banned additives in producing and processing seafood.

The United States also has strict requirements regarding antibiotic or chemical residues in seafood. The U.S. legal system is complicated, with both national and individual state laws governing imports. The FDA, the federal agency responsible for regulating and controlling imported foods, uses a "white list"[1] or antibiotic residues. Currently, the FDA permits only six antibiotics (chorionic gonadotropin, formalin solution, tricaine methanesulfonate, oxytetracyline, sulfamerazine and sulfadimethoxine/ormetoprim), with all others banned by default.

Overview of the Seafood Sector in Vietnam

Food processing is a large and rapidly growing industry in Vietnam. In 2005 value added in the food-processing sector was an estimated US$2 billion, or 4 percent of gross domestic product (GDP) and 21 percent of agricultural value added (Chau 2005). Furthermore, the contribution of food processing to GDP appears to be growing. In 1995, seafood processing represented 2.5 percent of GDP, and it grew twice as fast as GDP in the following 10 years (*Vietnam Economic Times* 2006). Vietnamese seafood exports have been increasing rapidly largely as a result of vastly increased production from aquaculture.

In 2008, Vietnam produced 4.58 million tons of aquaculture products. The Mekong River Delta is the largest fishpond, accounting for 87.2 percent of the national fish-rearing acreage (MOIT 2008). The main aquaculture product in the Red River Delta in northern Vietnam is freshwater prawn (*Macrobrachium rosenbergii*). The central provinces specialize in culturing sea products such as lobster, tuna, and seaweed (Hambrey and Carleton 2005).

The seafood-processing industry also plays an important role in Vietnam's exports. Currently aquaculture products rank fourth among Vietnam's exports, after oil and gas, textiles and garments, and footwear. In 2008, seafood product exports totaled US$4.5 billion, or 7.2 percent of Vietnam's total export value and 5 percent of its GDP (Table 1).

[1] The FDA white list consists of approved antibiotics, as listed in Federal Regulation Title 21 Food and Drugs.

Table 1—Contribution of aquaculture products to exports, 2000–08

Year	Value of total exports (US$ million)	Value of aquatic product exports (US$ million)	Share of aquaculture exports in total exports (%)
2000	14,482.7	1,478.5	10.2
2001	15,029.2	1,816.4	12.1
2002	16,706.1	2,021.7	12.1
2003	20,149.3	2,199.6	10.9
2004	26,485.0	2,408.1	9.1
2005	32,447.1	2,732.5	8.4
2006	39,826.2	3,348.3	8.4
2007	48,561.4	3,763.3	7.8
2008	62,906.0	4,509.4	7.2

Source: GSO 2009.

Vietnam exports processed aquaculture products to 105 countries. Together, the EU, Japan, South Korea, and the United States accounted for 67 percent of the export value and 55 percent of export volume of Vietnam's total aquaculture exports in 2008 (Table 2). After Vietnam and the United States signed a bilateral trade agreement in 2000, exports to the U.S. market increased sharply before falling in 2003 because of disputes over dumping of shrimp and catfish.[2] The EU's share of Vietnam's seafood exports grew from 9 percent in 1999 to 25.4 percent in 2008.

Frozen shrimp, fish, frozen squid, and dried fish accounted for more than 90 percent of aquaculture exports in 2008 (Table 3). Shrimp and catfish are by far the most important, with catfish exports growing dramatically and surpassing shrimp in volume by almost 350 percent in 2008. Frozen shrimp are exported primarily to Japan and the United States. Other kinds of fish are exported mainly to China and Japan, whereas recently cultured catfish mainly go to the EU and the United States. Dried and frozen squid are exported mainly to China, South Korea, Taiwan, and Southeast Asian countries. There are economies of scale in processing some products, such as frozen fillets and frozen shrimp, in contrast to dried fish, which are traditionally processed at the household level.

[2]The Catfish Farmers of America (CFA) argued that Vietnamese "catfish" were not catfish and that only the North American species, known as *Ictaluridae*, should be branded in this way. The U.S. Congress took CFA's side and barred the Vietnamese exporters from using the word "catfish," even though fishery experts maintained that the Vietnamese varieties looked and tasted the same as the U.S. product. The bill (a provision in Section 755 of Title VII–General Provisions of Public Law No: 107-76, Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriation Act 2002 to regulate the labeling of imported fish) allowed Vietnamese catfish to be sold in the U.S. market under the names "basa bocourti," "basa catfish," and "tra." The Vietnamese exporters complied with the bill and thereafter labeled their catfish "tra" or "basa" when exported to U.S. market. In other markets the name "catfish" remains unchanged.

Table 2—Aquaculture exports in 2008 by market

	2008		% change from 2007	
Market	Volume (metric tons)	Value (US$ million)	Volume (metric tons)	Value (US$ million)
EU	349,672	1,144.462	+25.0	+26.0
Japan	134,943	828.350	+13.2	+11.0
United States	108,064	744.623	+8.3	+3.3
South Korea	91,762	300.748	-0.1	+10.0
Russia	125,199	217.761	+118.9	+82.9
ASEAN	75,582	195.012	+13.0	+9.4
China	46,013	157.139	+0.5	+2.9
Ukraine	78,870	156.320	+202.6	+221.1
Australia	26,111	135.505	+8.8	+12.0
Others	200,127	629.499	+74.9	+27.2
Total	**1,236.344**	**4,509.418**	**+33.7**	**+19.8**

Source: GSO 2009.
Notes: ASEAN = Association of Southeast Asian Nations

Table 3—Vietnam's fishery exports by product, 2006–08

	2006		2007		2008	
Product	Volume (metric tons)	Value (thousand US$)	Volume (metric tons)	Value (thousand US$)	Volume (metric tons)	Value (thousand US$)
Frozen shrimp	158,447	1,460,586	161,240	1,509,477	191,553	1,625,707
Catfish	286,600	736,872	386,974	979,177	640,829	1,453,098
Tuna	44,822	117,133	52,818	150,955	52,818	188,694
Frozen cephalopods	69,763	222,190	82,184	282,374	86,704	318,235
Dried aquaculture products	35,479	142,195	35,364	146,938	32,676	145,762
Others	103,112	378,234	88,826	357,753	100,107	363,835
Total	**811,510**	**3,348,291**	**924,956**	**3,763,329**	**1,236,344**	**4,509,418**

Source: MOIT 2008.

Table 4—Violations of seafood hygiene standards by Vietnamese exports, 2002–07

Market	Contaminant	Number of cases by year				
		2002	2003	2004	2005	2007
Japan	Antibiotics	49	10	24	46	94
	Microorganism	10	9	15	39	
United States	Antibiotics	1	0	6	17	
	Microorganism	18	41	25	29	
Canada	Antibiotics	7	1	15	54	
	Microorganism	23	16	17	12	
EU	Antibiotics	49	8			
	Microorganism	10	32			

Source: NAFIQAVED 2006; MOIT 2008.

Sanitation Violations: Vietnamese Seafood Exports to the EU, Japan, and the United States

As already mentioned, Vietnam began exporting seafood products in the 1980s. From 1999 to 2008, exports increased dramatically, growing at an annual rate of 18 percent. In 2008 the country's seafood production reached 4.58 million metric tons and earned export revenues of US$4.5 billion. Currently, Vietnam has 470 seafood-processing companies. Of these, 346 are fully certified with seafood sector standards (set by the Ministry of Agriculture and Rural Development), and 245, 333, and 34 units are allowed to export to the EU, Japan, and the United States, respectively. Despite the certification of many processors, Vietnam's fishery industry has struggled to boost exports further because producers have had difficulties meeting the food hygiene and environmental standards imposed by international organizations and developed importing countries (Table 4).

Before 1999, the EU listed Vietnam as a Category 2 country for seafood exports, subjecting its shipments to 100 percent inspection. In 1999, Vietnam was moved to Category 1, requiring occasional or random inspection of 5 percent of shipments (Mai 2004). Many violations occurred during 2001–03, however, because new techniques allowed the EU to detect chemical residues at levels below what Vietnamese testing could detect. During this period, 76 shipments violated antibiotic residue regulations. All shipments were returned, and 70 of them were destroyed at a loss of US$15 million to exporters. Since the end of 2002, the EU has checked 100 percent of seafood shipments from Vietnam.

In the United States, all of Vietnam's exported seafood must pass through the FDA's automatic inspection system, which can reject any products and enterprises that fail to meet its requirements (An 2002). Many recent violations relate to microorganism hygiene standards as well as antibiotic residues. Three states—Alabama, Louisiana, and Mississippi—have completely banned the import and consumption of all Vietnamese fish. The FDA has used the Operational and Administrative System for Import Support (OASIS) network[3] to warn some violating enterprises. The loss to Vietnamese enterprises from U.S. regulations was an estimated US$300,000 in 2005 (Hanh 2005).

Both the EU and United States have regularly inspected the seafood production processes and factories in Vietnam that export products to these markets. When violations are discovered, importing countries are entitled to apply measures to prevent imports, at great loss to exporters. The EU uses a variety of sanctions in the case of violations, including rejecting the preferential tax on the

[3] OASIS is a system used to regulate imported products. It operates in conjunction with the U.S. Bureau of Customs and Border Protection's Automated Commercial System (ACS), which maintains information on imported products subject to tariffs or other restrictions. ACS is now being replaced by the Automated Commercial Environment (ACE).

imported goods, banning the import, destroying the goods, reducing the import quota, handing over the goods to the exporters, and removing violators from the list of enterprises that can export products to the EU. The United States applies similar sanctions. The most popular sanctions include listing the exporter in the OASIS warning system and destroying or returning the shipment (NAFIQAVED 2006).

For seafood exports to Japan, the most violations took place in 2007. Shrimp and squid were the primary culprits. As a result, Japan increased the rate at which it inspected Vietnamese shrimp shipments from 5 to 100 percent. In the first six months of 2007, 94 of 6,000 shipments from Vietnam violated antibiotic residue regulations. Given the severity of the problems, Japan has warned Vietnam that it may have to stop importing Vietnamese seafood. With about US$1 billion in export revenue from this market, the loss of the Japanese market would be a disaster for the Vietnamese seafood sector.

Stakeholders

The Government

The Vietnamese government has established a general policy and management framework on product quality, including food safety, for products of Vietnamese origin intended for human consumption. This policy is designed to protect consumers' health and ensure that all Vietnamese fishery products, for both the domestic and export markets, meet food safety requirements. Vietnam has SPS measures related to disease-causing organisms in fishery products, biotoxins in bivalves and puffer fish, and contaminants and additives in fishery products.

Vietnam has also developed a legal framework and standards to encourage the development of the seafood sector and its exports. The Ordinance on Food Hygiene and Safety was issued in 2003 by Vietnam's National Assembly. This ordinance was Vietnam's first overarching legal document to unify the nationwide management of food hygiene and safety during production and marketing. The ordinance prohibits illegal actions in aquaculture and food processing that have negative impacts on human health. In 2004 the National Assembly promulgated the Veterinary Ordinance under which imported and exported animals and animal products are subject to quarantine and must be controlled by competent veterinary agencies.

In addition, Vietnam has progressively reformed its legal system to help ensure market access and environmental sustainability of food and seafood production. The Environment Law is the foundation for Vietnam's system of laws on environmental protection. After being amended in 2005, the Environment Law set regulations similar to those in the EU and the United States on environmental protection in food and seafood production and processing (Articles 14, 16, and 19). Vietnam's Fishery Law, enacted in 2003, is an important legal document for the sustainable management and development of fisheries resources. The Fishery Law sets concrete regulations for environmental protection in fish capture, aquaculture, and seafood processing. It also contains mechanisms to implement the law, such as environmental planning and establishment of sea conservation areas, and sets out the division of ministerial responsibility for sustainable fisheries resource management.

Seafood Processors

In 2006 the fishery industry employed 4 million workers, or 10 percent of the labor force, of whom 723,000 produced aquaculture products. These employees now work in 714 communes in 28 coastal provinces. Vietnam has 488 seafood-processing factories with an annual input capacity of 800,000 metric tons. Seventy percent of them are small and medium-sized private enterprises.[4] About 80 percent of the processing factories are located in southern Vietnam (where some have developed modern facilities), 12 percent are in central Vietnam, and the rest are in the north (NAFIQAVED 2006). The Vietnam National Sea Products Corporation (Seaprodex) is the biggest processing and exporting enterprise. In 2004, it accounted for 32 percent of the total export value of the fishing industry.

According to Lem et al. (2004), 74 percent of seafood processors have Hazard Analysis and Critical Control Points (HACCP) certification, 54 percent

[4] In Vietnam small and medium-sized companies are defined as companies with less than 10 billion VND (equivalent to US$600,000) in paid-up capital and fewer than 300 employees.

are Good Management Practice certified, 24 percent have EU certification, and 16 percent are certified by the International Organization for Standardization (ISO). The majority of plants process shrimp for export. Other products include clams, swimming crabs, snails, mud crabs, oysters, and scallops. About 320,000 of processed fish products—including fish sauce, dried products, fishmeal, and frozen and chilled products—are supplied to the domestic market annually (Lem et al. 2004). Small factories produce mainly dried products because the technology is simple and the required facilities are relatively inexpensive. Dried squid, fish, shrimp, seaweed (*Gracilaria*), and products dried with spices are common products for the domestic market.

The Vietnamese Association of Seafood Exporters and Producers (VASEP)

The Vietnamese Association of Seafood Exporters and Producers (VASEP) was established in 1993 to represent and protect the interests of Vietnam's seafood exporters. With 185 members, the association frequently organizes meetings to unify objectives and activities. VASEP also organizes the sector to settle issues of common concern, such as fighting against the introduction of extraneous substances into raw seafood and supporting the application of sustainable management systems in aquaculture, such as Good Agricultural Practices (GAPs) and HACCP.

VASEP has developed long-term relationships with overseas seafood associations, exporters, and distributors to enlist the support of consumer allies and to lobby to protect Vietnamese trade interests. At present, VASEP is a member of the ASEAN Aquaculture Federation (AAF), the U.S. Fisheries Association, the Singapore Fisheries Association, and INFOFISH. In 2003, the AAF, with the participation of VASEP, criticized the EU's "zero residue" standard on nitrofurans in shrimps as not conforming to international standards. Representatives of AAF member countries have been unanimous in their efforts to have the EU loosen the permissible antibiotic levels for ASEAN seafood imports. VASEP has cooperated with many multilateral and bilateral food and seafood organizations, such as FAO, the International Trade Center (ITC), the Swiss Import Promotion Programme (SIPPO), the Japanese External Trade Organization (JETRO), the Mekong Private Sector Development Facility (MPDF), the Global Aquaculture Alliance (GAA), and the Marine Stewardship Council (MSC), in helping to improve the competitiveness of small and medium-sized enterprises.

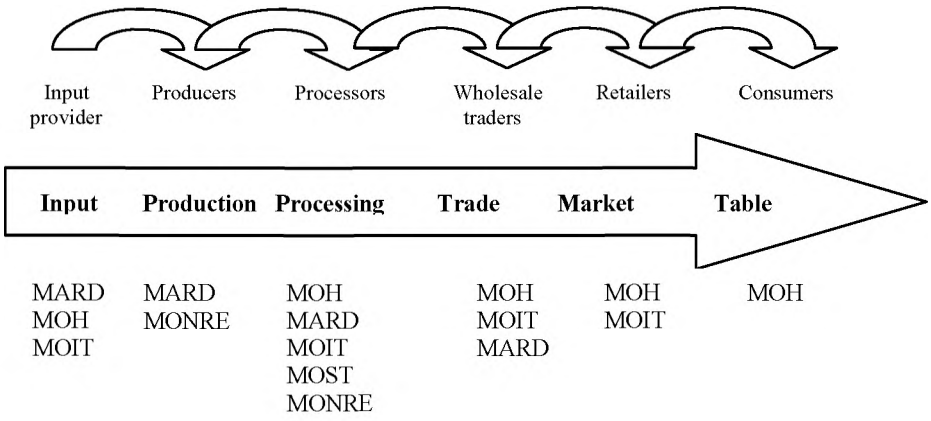
Policy Issues

Problems with the Regulatory System

Vietnam lacks a comprehensive model for managing food safety. Currently five ministries—the Ministries of Health (MOH), Industry and Trade (MOIT), Agriculture and Rural Development (MARD), Science and Technology (MOST), and Environment and Natural Resources (MONRE)—are accountable for managing chemical substances and antibiotics. The system is divided into three subsystems composed of (1) the MOH, which is the leading agency responsible for guiding and coordinating with other ministries and sectors in the management of food hygiene and safety, under the specialized guidance of the National Agency for Food Hygiene and Safety established in 2001; (2) the professional ministries, including MOST and MARD; and (3) other supporting ministries.

As shown in Figure 1, most areas of responsibility are clearly defined, although there is danger of overlap as well as of neglect of some issues. For example, under the Ordinance on Food Hygiene and Safety, the MOH has been assigned responsibility for assuring the hygienic status of all fresh and processed foods, including aquatic products, with the Vietnam Food Administration (VFA) as the implementing agency (Prime Minister's Decision No. 14/1999/QD-TTg, April 2, 1999). At the same time, the National Fisheries Quality Assurance and Veterinary Directorate (NAFIQAVED) under the MARD was established to help the prime minister govern the quality, hygiene, and safety of the fishery industry from production to processing to market. This situation results in overlapping management functions and responsibilities between ministries at both the central and local levels. In some cases there may be excessive enforcement, shirking of responsibilities, and shifting of blame.

Figure 1—Food safety responsibility along the food chain in Vietnam



Source: World Bank 2006.

Lack of Knowledge

All Vietnamese seafood export enterprises confront difficulties in understanding the food hygiene and environmental requirements in individual importing markets as well as consumer chains. To export their products, they must keep up with sophisticated and often changing standards set by international, national, and private bodies. In 2005 a survey of export enterprises in different sectors showed that only 17 percent of Vietnamese enterprises understood the requirements set by Japan, 14 percent of enterprises understood the EU standards, and only 8 percent understood the U.S. standards. The survey also found that 43 percent of exporters' information on these requirements came from official Vietnamese documents (Ministry of Trade 2005), yet the government is not always up to date on international standards. For instance, some drugs banned in the United States since 1997, such as fluoroquinolone, were not on the Vietnamese list of banned chemicals and antibiotics. Hence, in 2004 Vietnam's seafood exports to the United States were repeatedly infected with these drugs. Shippers were warned, and shipments were either returned or destroyed.

Small Production Scale

Hygiene and environmental standards are growing increasingly stringent in response to new scientific evidence and consumers' growing concerns. In 2006 the EU increased the number of antibiotics for which zero residues are allowed from 10 to 26. Individual markets continually update their list of banned antibiotics, making it difficult for state management agencies to issue up-to-date legal documents as well as for processors to adjust production in time to meet the new requirements (NAFIQAVED 2006). Normally, whenever there is a change in international SPS standards, it takes at least three years for Vietnam to adopt and follow such requirements (Phong 2005). In the near future, Vietnamese seafood export processors may also need to apply GAPs and ISO 14000 standards to remain competitive. With Vietnam's processing factories predominantly small and medium-scale enterprises, the large investments necessary to comply with these requirements could reduce significantly their competitiveness.

Moreover, though there are some common trends in food safety regulations in industrial countries, product standards and inspection requirements still vary by country. For example, the United States currently permits the use of only 6 types of antibiotics and 18 kinds of chemical substances in culturing aquatic products. The EU has its own list of banned or limited-use substances. Although the United States bans fluoroquinolones, the EU allows them in limited quantities. For a country like Vietnam, which relies on small-scale production, it is difficult to keep up with these different standards. And with small-scale production, it is impossible to develop separate aquaculture areas to

meet the needs of different export markets (Phong 2005).

Lack of Technical and Financial Capacity

It is difficult for Vietnam's state management agency to detect antibiotic residue in export products because of a lack of technology and equipment. To complicate matters, the EU often lowers the detectable limits for antibiotic residue when upgrading its inspection facilities. The EU has developed new inspection devices (LC-MS/MS[5]) that can detect minute quantities of antibiotic residue (Phong 2005; Mai 2004). At present, the detected limit of the EU is lowest (0.003 parts per billion), while Canada can detect 0.3 ppb and the United States, 1 ppb. Although the EU has adopted the use of LC-MS/MS devices, Vietnam can afford only the less-sensitive LC-MS devices. Although Vietnam's state agency inspects 100 percent of exports, it cannot detect the same levels as the EU. As a result, exporters still face the risk of having products returned or destroyed and the consequent loss of earnings and markets.

Moreover, raw material suppliers have not met seafood processors' demands for quantity or quality of seafood products. Antibiotics residues begin when the farmer uses too many chemicals. Local authorities promote the expansion of the area devoted to aquaculture, but they do not have the capacity to control sanitation. NAFIQAVED is responsible for sampling the sites to inspect for hygienic conditions, but the sites are typically small, are scattered across the country, and use a variety of technologies. The samples taken by NAFIQAVED are representative of environmental pollution indicators (heavy metals, pesticides), but they are not sufficient to inspect the indicators of other elements (chemicals, antibiotics). The small size of fish farms and technological differences between them also make it difficult for the farms themselves to implement effective hygiene-controlling measures because one farm can be affected by pollution from adjacent ones.

[5] LC-MS/MS is a liquid chromatographic mass spectrometric method for qualitative and quantitative detection of chloramphenicol (CAP) in shrimp at the sub parts per billion level.

Policy Options

The Government

Reforming institutional structures and responsibilities. The high levels of antibiotic residues in Vietnamese seafood exports to the EU and the United States from 2001 to 2007 resulted in significant economic loss for Vietnamese enterprises and reduced the reputation and competitive capacity of Vietnam's seafood in the world market. This situation was in large part due to the poor management of chemicals, veterinary drugs, and biological products in all steps of the seafood life cycle, from seed production, feeding, harvesting, preservation, preprocessing, and transport to processing and product marketing (Hanh 2005). To reduce confusion and overlap, the government should strengthen organization and coordination so that responsibilities for monitoring and controlling food safety are clearly specified and distributed among different ministries and agencies at different levels. The key issue in food safety is to protect human health. As such, the lead implementing agency should be MOH. It should integrate food safety into a strong enforcement and regulatory program.

Helping enterprises meet regulations and standards on hygiene and the environment. In recent years, the Vietnamese government has paid more attention to disseminating information and supporting seafood enterprises. MARD coordinates closely with the Ministry of Foreign Affairs and MOIT to continually collect and update information on the standards and regulations affecting the seafood industry. Regulations collected and issued by the government and MARD are published and regularly updated on the MARD and NAFIQAVED websites. Every month, NAFIQAVED publishes the results of seafood testing of local fisheries departments and its provincial branches to the aquaculture producers in order to ensure hygienic and safe seafood and to avoid economic loss caused by poor-quality raw materials.

An agency specializing in collecting and distributing relevant food safety information for fisheries under MARD will be established. This agency will work closely with MOIT, the American Chamber of Commerce (AMCHARM), the European Chamber of Commerce (EUROCHARM), the Vietnam Chamber of Commerce and Industry (VCCI), and

international standard-setting bodies to collect, study, analyze, and forecast new standards on hygiene and the environment by importing countries. This agency will also create official channels for distributing the information to fisheries management agencies and enterprises.

Applying good aquaculture practices. At present, many countries, in particular the United States and the EU, are applying GAPs procedures in seafood production and aquaculture to limit the environmental effects of the production process and to guarantee food hygiene and safety for consumers. According to MARD's assessment, the EU and the United States are likely to enact regulations on the application of the GAPs in aquaculture. In advance of this development, MARD has implemented experimental GAPs programs nationwide. In 2004 and 2005 NAFIQAVED carried out an experimental GAPs program for the intensive and extensive culture of the prawn *Penaeus monodon* at six points, each in a different key fishery province (NAFIQAVED 2006). The results of this program are being compiled in an instruction manual to guide the application of GAPs in intensive and extensive *P. monodon* culture. MARD is also drafting regulations for inspecting and certifying culture areas that meet GAPs standards, which will be disseminated across the country.

MARD has so far implemented these measures in 12 safe culture areas (without antibiotic residue) in 9 provinces. The investment cost for each area was VND 5 billion,[6] of which VND 2 billion was spent on equipment to test for antibiotic residues and microorganisms during the culture process in accordance with GAP procedures.

The Private Sector

According to World Bank (2005), when facing SPS and environmental barriers in export markets, the private sector generally responds by using a strategy of "exit and compliance." In Vietnam, exporting enterprises have applied this approach to cope with regulations set by importing countries in order to enhance exports and increase the market share and competitiveness of Vietnam seafood products.

Exit. In the face of strict SPS and environmental standards in the EU and the United States, many exporting enterprises have chosen to exit these countries and have moved to new markets with looser technical barriers and SPS control measures.

After 2003, some enterprises moved their exports to the Japanese market, which had less strict environmental and hygiene standards than the United States and the EU. Moreover, in general, the Japanese relationship with Vietnamese seafood processing companies is conducted with a long-term view, emphasizing quality and freshness, rather than focusing specifically on hygiene standards. Japanese trading houses are generally involved in designing and implementing contracts to ensure the quality and hygiene of seafood imports. According to Japanese law, the importing company is responsible for cases of poisoning or other problems related to seafood (Lindahl 2005). Thus, the consequences of standard violations in Japan are fairly small. Starting in 2006, however, Japan imposed stricter hygienic standards for seafood products exported from Vietnam.

Recently, Vietnamese exporters have explored the South Korean market despite its rather high SPS standards. South Korea has inspected Vietnam's testing laboratories and recognized that they have attained ISO 17025 or the equivalent standard for the control of chemical and antibiotic residues. As a result, exports from Vietnam are not subject to recontrol upon arrival in South Korea. Vietnam is also extending seafood exports to China, Chinese Taipei, and Russia, whose standards are less strict than those of the United States and the EU.

Compliance. Vietnamese exporting enterprises attach great importance to complying with the standards set by their main export markets. To help improve the quality of the raw material inputs in the processing of seafood products, several enterprises have shifted to feed produced by foreign enterprises or by joint venture companies located in Vietnam, such as Cargill and Khanh Hoa, which apply HACCP to ensure that feed is not infected with banned antibiotics, chemicals, or microorganisms.

At the same time, export-processing plants have made large investments in food hygiene, safety, and environmental management systems to allow for exports to the EU, Japan, and the United States. According to NAFIQAVED (2006), of the 488 industrial-scale establishments involved in seafood

[6] Current exchange rate is US$1 = VND 17,800.

production and trading in Vietnam, 350 plants have applied and been acknowledged to have attained the HACCP standard (that is, they are allowed to export products to Japan and the United States), 54 percent of plants have been granted the GMP certificate, and 16 percent have been certified to attain the environmental management standard ISO 14000. In Vietnam, 20 enterprises have purchased the ELISA machine to check antibiotic residues in seafood production. Other enterprises have taken the initiative to hire NAFIQAVED to conduct regular tests of their products before export in order to decrease the risk of rejection in export markets.

Assignment

Your assignment is to recommend to the Vietnamese government policies how to deal with the combined food safety and trade issues related to the expansion of aquaculture production for export and domestic consumption.

Additional Readings

Anders, S., and J. A. Caswell. 2006. Assessing the impact of stricter food safety standards on trade: HACCP in U.S. seafood trade with the developing world. Paper presented at the annual meeting of the American Agricultural Economics Association, Long Beach, CA, July 23–26.

Anderson, J. L. 2003. *The international seafood trade*. Cambridge, UK: Woodhead Publishing.

Jaffee, S., and S. J. Henson. 2004. *Standards and agro-food exports from developing countries: Rebalancing the debate.* Policy Research Working Paper Series No. 3348. Washington, DC: World Bank.

Roheim, C. 2004. Trade liberalization in fish products: Impacts on sustainability of international markets and fish resources. In A. Aksoy and J. Beghin, eds., *Global agricultural trade and developing countries*. Washington, DC: World Bank.

World Bank. 2005. *Food safety and agricultural health standards: Challenges and opportunities for developing country exporters*. Washington, DC: Poverty Reduction and Economic Management Unit and Agricultural and Rural Development Department, World Bank.

References

An, D. 2002. The relation between environmental protection and trade in the international trading systems and its impacts on the Vietnam legal framework of environmental protection. Master's thesis, Hanoi Law University.

Anders, S., and J. A. Caswell. 2006. Assessing the impact of stricter food safety standards on trade: HACCP in U.S. seafood trade with the developing world. Paper presented at the annual meeting of the American Agricultural Economics Association, Long Beach, CA, July 23–26.

Chau, H. 2005. Seafood export reaches US$2.5 billion. *Journal of Fishery* 12: 5–6.

GSO (General Statistics Office). 2009. *Statistical year book of Vietnam 2008*. Hanoi: Statistical Publishing House.

Hambrey, J., and C. Carleton. 2005. *Seafood potential markets and research strategy.* Hanoi: Vietnam Institute of Fishery Economic and Planning.

Hanh, D. 2005. Discussion on the use of antibiotics and chemicals in seafood production and processing. *Journal of Fishery* 2: 16–20.

Hartman, H. 2005. *Food safety from a consumer perspective: The Hartman Group pulse report*. Bellevue, WA: Hartman Group.

Le, T., T. Dinh, and H. Nguyen. 2008. Vietnam agriculture and trade: Food and sanitation issues (A case of aquaculture). Draft working paper. National Economics University, Hanoi.

Lem, A., U. Tietze, E. Ruckes, and R. Van Anrooy. 2004. *Fish marketing and credit in Vietnam*. FAO Fisheries Technical Paper No. 468. Rome: Food and Agriculture Organization of the United Nations (FAO).

Lindahl, J. 2005. *Vietnam's seafood processing industry divided between the global and the regional markets.* Draft working paper, Hanoi, Vietnam.

Mai, N. 2004. *Export of Vietnamese agricultural and seafood products to the European Union: Identify barriers in terms of environmental standards.* Hanoi: Political Publishing House.

Mead, P., L. Slutsker, V. Dietz, L. F. McCaig, J. S. Bresee, C. Shapiro, P. M. Griffin, and R. V. Tauxe. 1999. Food-related illness and death in the United States. *Emerging Infectious Diseases* 5 (5): 607–25.

Ministry of Trade. 2005. *Understand the relation between trade and environmental policies and implications for sustainable development in Vietnam.* Internal report. Hanoi.

MOIT (Ministry of Industry and Trade). 2008. *Exports and imports of Vietnam.* Internal report. Hanoi.

NAFIQAVED (National Fisheries Quality Assurance and Veterinary Directorate). 2006. *Annual report on fisheries quality assurance and veterinary.* Hanoi.

Phong, T. 2005. Changes in institutional arrangements for better management of antibiotics and chemicals used in the fishery sector. *Journal of Fishery Trading* 9: 10–11.

Stranks, J. 2007. *A–Z of food safety.* London: Thorogood Publishing.

Tai, N. 2005. A survey on the use and management of drugs, chemicals, and biological products used in aquaculture in Vietnam. *Monthly Fisheries Information Bulletin* 6: 29–34.

USDA (U.S. Department of Agriculture) Foreign Agriculture Service. 2007. *GAIN report 2007: Vietnam fishery products Annual report 2007.* Washington, DC.

Vietnam Economic Times. 2006. Socio-economic issues in Vietnam: Some statistics. Special issue, 64–70.

WHO (World Health Organization). 1995. *Control of foodborne trematode infections: Report of a WHO study group.* Technical Report Series No. 849. Geneva.

World Bank. 2005. *Food safety and agricultural health standards: Challenges and opportunities for developing country exporters.* Washington, DC: Poverty Reduction and Economic Management Unit and Agricultural and Rural Development Department, World Bank.

———. 2006. *Vietnam food safety and agricultural health action plan.* Report No. 35231. Hanoi.